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THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

Report on the Regional Preparatory Conference for the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space for Asia and the Pacific

(Kuala Lumpur, 18-22 May 1998)

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I. Introduction

A. Background and objectives

1. The General Assembly, in its resolution 52/56 of 10 December 1997, endorsed the report of the Committee on the Peaceful Uses of Outer Space on the work of its fortieth session,[1] which included the recommendation of the Preparatory Committee for the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) that the United Nations Programme on Space Applications should organize, as part of its programme of regular activities in 1998 and 1999, regional preparatory meetings for UNISPACE III.[2]

2. In order to assist Member States in nominating appropriate individuals to represent them at and contribute to the deliberations of the UNISPACE III regional preparatory conferences, the Office for Outer Space Affairs of the Secretariat made available to each Member State the provisional agenda for UNISPACE III itself, as well as the programme of the preparatory conferences.

3. The primary objectives of UNISPACE III are: (a) to promote effective means of using space technology to assist in the solution of problems of regional and global significance; and (b) to strengthen the capabilities of Member States, in particular the developing countries, to apply space technology for economic, social and cultural development. Other objectives of UNISPACE III are: (a) to provide developing countries with opportunities to define their needs for space applications for development purposes; (b) to consider ways of expediting the use of space applications by Member States to promote sustainable development; (c) to address the various issues related to education, training and technical assistance in space science and technology and their application; (d) to provide a valuable forum for a critical evaluation of space activities and to increase awareness among the general public regarding benefits of space technology; and (e) to strengthen international cooperation in space technology and applications.

4. The present report contains the results of the Regional Preparatory Conference for Asia and the Pacific, which was co-sponsored by the European Space Agency and organized in cooperation with and hosted by the Government of Malaysia.

5. In order to accomplish the objectives of the Preparatory Conference the Office for Outer Space Affairs requested distinguished individuals, mostly from countries in Asia and the Pacific, to address various issues of interest and concern to the region in the specific areas identified in the programme of the Preparatory Conference. Those areas were also addressed in the 12 background papers which the Committee on the Peaceful Uses of Outer Space had requested the Office to prepare. The background papers were dispatched in advance to the persons invited to speak at the Preparatory Conference for their possible use in the preparation of their presentations.

6. Participants at the Preparatory Conference were requested to draw necessary conclusions and propose essential recommendations for future programmes that could benefit the region of Asia and the Pacific; those were considered further and analysed at the discussion sessions of the Conference.

7. Planning for the Preparatory Conference was guided by the experience of the Office for Outer Space Affairs in implementing the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82), held in Vienna from 9 to 21 August 1982.

8. The Preparatory Conference took into consideration the objectives of UNISPACE III, focusing on (a) enhancing the understanding of Member States of the role and use of space technology in social and economic development; (b) issues associated with implementing space technology and applications programmes; and (c) improving and facilitating regional and international collaboration.

B. Organization and programme of the Preparatory Conference

9. The Preparatory Conference was attended by 64 participants from 23 States Members of the United Nations. Representatives and observers came from the following countries: Australia, Bangladesh, China, Fiji, France, India, Indonesia, Iran (Islamic Republic of), Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Pakistan, Philippines, Republic of Korea, Russian Federation, Singapore, Sri Lanka, Thailand, United Kingdom of Great Britain and Northern Ireland, United States of America and Viet Nam. Representatives from the following international organizations also attended: United Nations Development Programme, American Institute for Aeronautics and Astronautics, the Governing Board of the Centre for Space Science and Technology Education in Asia and the Pacific, Committee

on Earth Observations Satellites and European Space Agency.

10. Funds allocated by the United Nations and the European Space Agency were used to defray the costs of air travel and an allowance for incidental expenses of 16 participants from 12 countries. The Government of Malaysia, through its Space Science Studies Division of the Ministry of Science, Technology and the Environment, provided room and board for seven participants. The programme for the Preparatory Conference (see annex), which was conducted through a number of plenary and working group meetings, was developed by the Office for Outer Space Affairs.

II. Conclusions and recommendations of the Preparatory Conference

A. Observations and recommendations of the Preparatory Conference

11. The recommendations of the Preparatory Conference address the needs of the region of Asia and the Pacific in each of the following five specific areas: (a) the Earth and its environment; (b) communication and navigation systems; (c) benefits of space exploration, including the role of microsatellites; (d) education and training; and (e) international cooperation. The Preparatory Conference made the following conclusions and recommendations addressed to Member States of the region of Asia and the Pacific, international organizations and other entities with space-related activities.

1. The Earth and its environment

Observations

12. The Preparatory Conference noted:

(a) The immense potential of space technology applications for providing vital inputs for soil conservation, water resource management, forest monitoring, land management, coastal and river basin protection, agriculture and drought management, flood mapping and sustainable integrated development;

(b) That a constellation of satellites would substantially enhance temporal, spectral and spatial coverage of target areas.

13. The Preparatory Conference recognized the existence of problems encountered in implementing regional cooperative efforts involving data exchange and technology transfer owing to differences in national policies and priorities.

Recommendations

14. In view of the contributions of remote sensing and related technologies towards the well-being of the global community, the promotion of international cooperation in the development and use of remote-sensing technologies should be accorded priority in the agenda of UNISPACE III.

15. The Committee on Earth Observation Satellites should give serious consideration to the standardization of spectral aspects of sensors, data formats and other characteristics of the ground segment, in order to contribute to the development of Earth observation systems, especially in order to meet the emerging needs of countries in the region of Asia and the Pacific.

16. Member States should enhance consultations among themselves in planning future Earth observation programmes. They should also fully utilize and enhance research and information networking to promote the exchange of data and research results in the International Geosphere-Biosphere (Global Change) Programme and related Earth studies.

17. Policy and decision makers should be better informed about the immense potential of satellite remote sensing and related technologies for the effective management of resources and, in particular, for disaster prevention and mitigation.

18. Member States in the region should formulate appropriate space-related policies and strive to play an effective role in the delivery of value-added services.

19. Member States should follow a unified approach to developing a standard format for the acquisition, processing and handling of remote-sensing data.

20. Satellite operators should maintain reasonable continuity of their services.

21. In view of the existence of problems encountered in implementing regional cooperative efforts involving data exchange and technology transfer owing to differences in national policies and priorities, Member States should develop more workable and acceptable mechanisms to facilitate coordination and cooperation in that area.

22. The Regional Preparatory Conference for Asia and the Pacific agrees that any regional programme should

include the exchange of data and the sharing of information derived from data analysis.

2. Communication and navigation systems

Observations

23. The Preparatory Conference emphasized the importance of space communications in rural telecommunications and education, distance learning, telemedicine and further improvement of appropriate technologies for these services.

24. The Preparatory Conference concluded that, for the region of Asia and the Pacific in general, and its island nations in particular, satellite communications were of paramount importance.

25. The Preparatory Conference noted:

(a) The importance of telecommunications and, in particular, satellite communications as a resilient means of preparing for, warning against and providing relief from disasters;

(b) The need for the involvement of the International Telecommunications Satellite Organization (INTELSAT), the International Mobile Satellite Organization (Inmarsat) and other space communication entities in providing communications satellite capacity in order to foster the development of the regional space-based services;

(c) The concern expressed by some participants with regard to certain programming material being broadcast via satellite, which, in their view, ran counter to their social and cultural values;

(d) The potential of low-cost ground terminals in space communications for countries in Asia and the Pacific;

(e) The need for a civilian global navigation and positioning system and the importance of augmenting the Global Navigation Satellite System to include the region of Asia and the Pacific, for which the overlay technique using geostationary orbit was an appropriate first step.

Recommendations

26. Member States should take advantage of emerging space techniques by "leapfrogging" into advanced telecommunications systems.

27. The Regional Preparatory Conference for Asia and the Pacific recommends that satellite operators and service providers should reduce the cost of systems and services for space communications in developing countries in the region. The Regional Preparatory Conference notes that the private sector has an important role to play in that effort.

28. Satellite capabilities should be exploited to maximize their use in assisting in rural development. The private satellite communications industry should also adequately deal with such urgent needs.

29. The public and private sectors of industry should cooperate in the development of space communications technology and its applications. The Regional Preparatory Conference for Asia and the Pacific recommends that each country in the region should provide the necessary conducive environment by enacting appropriate legislation in order to promote investments.

30. Member States should, to the extent possible, share space as well as ground segment capabilities.

31. The international satellite organizations should take into account the needs and limitations of the countries in Asia and the Pacific in future space communications systems and applications. In this connection, the Regional Preparatory Conference for Asia and the Pacific recommends that such entities as INTELSAT, Inmarsat and other space communications entities should provide communications satellite capacity with the aim of promoting regional space-based services.

32. Member States should be active players in the space communications industry and not just users of space communications technologies.

33. Local telecommunications infrastructure should be developed using local expertise, with assistance from both regional and international organizations.

34. The role of the Asia-Pacific Satellite Communications Council, as a regional forum for formulating a collective stand to deal with the issues of frequency planning and coordination, as well as training, should be strengthened by Member States in the region.

3. Benefits of space exploration, including the role of microsatellites

Observations

35. The Preparatory Conference noted:

(a) The status of and the emerging trends in commercialization in the space sector, especially the increasing role of private operators, the trends towards cost-effective space systems and efforts to harness the full potential of the space-based services;

(b) The existence of national low-cost micro-satellite and mini-satellite programmes in the region, which provided a new and affordable opportunity for regional cooperation and capacity-building in space-related activities;

(c) That commercial operation of communication satellite systems had proved to be a viable proposition;

(d) That there were considerable possibilities in a number of countries, including developing countries, for small satellites for earth observation;

(e) The offer of the Republic of Korea to implement a regional collaborative project based on a common payload which would enable Member States to develop their human resources and serve as technology demonstrators.

Recommendations

36. The Regional Preparatory Conference for Asia and the Pacific recommends that Member States in the region, particularly developing countries, should work together in the development of microsatellites.

37. Recognizing that microsatellites provide a new and affordable opportunity for regional cooperation and space capacity-building, the Regional Preparatory Conference for Asia and the Pacific recommends that countries in the region should be fully engaged in the development of low-cost microsatellite and mini-satellite programmes.

4. Education and training

Observations

38. The Preparatory Conference noted with satisfaction the establishment of the Centre for Space Science Technology and Education in Asia and the Pacific and the recent addition of two more academic programmes, namely, satellite meteorology and space sciences.

Recommendations

39. Member States should implement public awareness programmes, especially in primary and secondary schools, focusing, *inter alia*, on the value of space technology in everyday life. The programmes should also target decision makers and planners and other potential users to make them aware of the relevance of space technology applications in various socio-economic sectors.

40. The Regional Preparatory Conference for Asia and the Pacific notes that the self-sustaining financial status of the Centre for Space Science and Technology Education in Asia and the Pacific is essential to the fulfilment of its goals and objectives. Member States should take full advantage of the educational facilities offered by the Centre. The Centre should continually adjust its curriculum and teaching facilities to respond to developments taking place in space technology, especially those directly related to the needs of the countries in the region.

41. The Centre and other similar institutions and facilities in Asia and the Pacific should provide region-specific education and opportunities to share experiences to scholars in the region at an affordable cost and without posing many logistical problems.

42. The development of self-learning tools, such as electronic media and computer-based modules, in education and training should be consistent with the requirements of user countries in the region.

43. There should be political will at the national level to give the highest priority to education in general and space science education in particular.

44. A network of educational facilities providing education and training in space science and technology at the postgraduate level should be developed to meet the increasing need in the region for adequately educated and trained human resources.

5. International cooperation

Observations

45. The Preparatory Conference recognized that the lack of infrastructure, funds, skilled manpower and related facilities constituted a major impediment to the implementation of appropriate space-related activities.

46. The Preparatory Conference affirmed that local needs differed from country to country.

47. The Preparatory Conference noted:

(a) That a number of problems impinging upon economic and social sustainable development could be addressed by space technology. While doing so, a regional approach should be explored;

(b) The existence of several initiatives at the national level to develop space technology capability in the region;

(c) The opportunities for regional collaboration provided through the implementation of joint projects such as a satellite-based disaster management, monitoring and evaluation system and satellite-based remote communications;

(d) The initiative of the Economic and Social Commission for Asia and the Pacific (ESCAP) to streamline the regional efforts in space activities. That initiative had taken into consideration the feedback of nine countries in the region of Asia and the Pacific and a concept paper which, among other things, comprised a proposed framework for a regional cooperation mechanism for space technology development and applications;

(e) The European experience in realizing the regional space cooperation programme, which had subsequently led to the formation of the European Space Agency;

(f) The opportunities for human resource training and technology transfer offered by commercial entities;

(g) That the Committee on the Peaceful Uses of Outer Space occupied a focal point position for promotion of international cooperation. However, the view was expressed that the region was under-represented in that body as, in spite of the large population and direct relevance of space technology applications to a large number of problems confronting the region, only 15 of the 61 members of the Committee were from the region.

Recommendations

48. Action must be initiated to promote intensive cooperation among Member States in the region to enable them to benefit from space technology applications by sharing experiences and expertise. In this connection, the Regional Preparatory Conference recognizes that substantive joint projects provide a good basis for regional cooperation, the success of which will depend on enhanced national activities and programmes.

49. The Regional Preparatory Conference for Asia and the Pacific emphasizes that, in order for regional cooperation to succeed, higher levels of investment will be needed in the social sector, including in human resource development. The Regional Preparatory Conference agrees that Member States in the region should share their experiences in different areas of space technology for the development of human resources, through the exchange of technical information and education packages.

50. The Regional Preparatory Conference for Asia and the Pacific recommends that, in order to advance the state of space research and development activities in the region, Member States should allocate more funds to such activities.

51. The Regional Preparatory Conference for Asia and the Pacific agrees that the formation of a regional space agency should be approached in a step-by-step manner and that comprehensive preparatory work will have to be carried out.

52. Member States should fully utilize existing mechanisms of regional and international cooperation such as the Regional Space Applications Programme for Sustainable Development in Asia and the Pacific of ESCAP and the Committee on Earth Observation Satellites. The coordination involving the United Nations Programme on Space Applications and ESCAP should be further strengthened.

53. Given the wide diversity among the countries in Asia and the Pacific, which include many developing countries, the United Nations should play a more active role in the coordination of space-related activities in the region, with a view to fostering international cooperation.

54. Future satellite programmes in Asia and the Pacific should be formulated on a goal-oriented basis, by all concerned, taking into account the needs of the region.

55. The Regional Preparatory Conference for Asia and the Pacific recognizes the immediate need for adequate space-based communications, disaster monitoring and disaster evaluation facilities for the Pacific island nations. It notes the possibility of those nations using space-based communications systems to facilitate the exchange of relevant data. The Regional Preparatory Conference recommends that ESCAP should lead the initiative to assist the Pacific island nations in that endeavour.

56. The Regional Preparatory Conference agrees that UNISPACE III should affirm that space-based services for search and rescue, disaster monitoring and management, and weather-related uses should be free of commercial considerations.

B. Possible steps for addressing the recommendations

57. It was stated that a mechanism should be established through which opportunities are provided for scientists and engineers of developing countries to take part, in the form of on-the-job training, in ongoing space technology projects of other countries. The technical capabilities acquired by those scientists and engineers would have two effects: (a) they would be able to make significant contributions to their nations' future space activities; and (b) their countries would gain the confidence to participate in regional space projects.

58. The Office for Outer Space Affairs should first endeavour, with the Space Technology Applications Section of ESCAP, to examine the achievements of existing regional space initiatives in the region of Asia and the Pacific as well as the obstacles confronting them. The Expert on Space Applications of the Office for Outer Space Affairs, the international focal point for space issues, was in the appropriate position to undertake such an endeavour. The result could then be discussed at a dialogue forum for the harmonization of the various initiatives organized by the ESCAP Space Technology Applications Section. Therefore, a discussion on mechanisms for promoting regional space cooperation at the dialogue forum would be in line with further action in the implementation of the recommendations of the Preparatory Conference.

59. The Office for Outer Space Affairs should augment its existing staff with a view to strengthening and enhancing its role as coordinator and promoter of international cooperation in space.

60. The subject of the United Nations as the focal point of international cooperation in space technology and applications should occupy a key position in the deliberations of the Committee on the Peaceful Uses of Outer Space and UNISPACE III. The Committee should make the topic a regular agenda item in order to monitor the progress being made in that area under the auspices of the United Nations.

61. It was stated that four regional working groups under ESCAP[1] had recommended that environmental satellite matters and activities within the framework of the programme of the World Meteorological Organization be coordinated to provide guidance for regional offices on the potential of remote-sensing techniques in meteorology, hydrology and related disciplines. Consequently, UNISPACE III should focus on reorganizing the above activities with a view to coordinating regional cooperation in satellite technology applications.

III. Summary of the presentations

A. General problems of the region of Asia and the Pacific

62. It was stated that developing countries in Asia and the Pacific were confronted with a number of serious problems that needed immediate attention. Space technology was in a position to address many of those problems, provided that impediments to the application of the technology were removed through suitable legislation and that an appropriate policy framework was established and implemented. The main problems were: (a) burgeoning population; (b) urban sprawl; (c) low literacy rates; (d) frequent devastations through floods, hurricanes/cyclones, forest fires, volcanic eruptions and earthquakes; (e) deforestation; (f) water logging and salinity; (g) very low agricultural yields; (h) environmental pollution; (i) poor telecommunications infrastructure; (j) inadequate database for sound decision-making and sustainable development planning; (k) unsatisfactory industrial/economic support infrastructure; and (l) poverty, disease, malnutrition and hunger.

63. The problems confronting the region required immediate remedial measures through the concerted efforts of the international community. For any such effort, there was a basic need for sequential and holistic information. Since Earth observations were capable of providing synoptic and authentic information on a geographic basis, the countries of the region should come to realize the benefit of harnessing those new developments in the field of information technology for developmental planning.

B. The Earth and its environment

64. Potential users and decision makers had not always been aware of the value of satellite data and were even less aware of how such data could be accessed. The aim must be to make satellite data available to all who needed it at affordable prices and in a timely manner. The process must be unhindered by unnecessary bureaucratic complications and free of external influences.

65. In the light of the immense potential of space remote sensing in providing vital input for soil conservation, water resources management, forest monitoring, land management, coastal and river basin protection, agriculture and drought management, and flood mapping and sustainable integrated development, action must be initiated to promote intensive cooperation among various countries within the region to enable them to benefit from each other's expertise. Given the fact that countries such as China, India and Japan had launched their own remote-sensing satellites and that several countries within the region had developed less expensive ground hardware and applications expertise, the sharing of experience and cooperation within the region should be very productive. Access to remotely sensed data and pricing policies

should be such that it promoted the intensive use of such data.

66. It was important that the concerns, constraints and needs of the developing countries be taken into account in the planning of new Earth observation satellite systems and to maximize the use of existing satellites. Consideration should be given to whether the Committee on Earth Observation Satellites could be used for that purpose, following the necessary changes in its structure, to give adequate representation to end-users, or whether a new international user forum was needed.

67. End-user needs in developing countries should not be described in space terms (e.g. orbit, type of sensor etc.), but rather, primarily in terms of the service (measurement etc.) needed on the ground, and should be related to end-users' problems.

68. In view of the vital importance of meteorological data from geostationary satellites (such as the Indian National Satellite System (INSAT) and the geostationary meteorological satellite (GMS) and from polar orbiting satellites such as the National Oceanic and Atmospheric Administration (NOAA)) for the region and of the fact that inexpensive ground hardware had been developed by several countries within the region to obtain and use such data for practical purposes, action should be taken to ensure access to real-time meteorological satellite data on a continuous basis. It was also necessary to share data within and between countries of the region and to exchange operational techniques and information on different kinds of hardware to enable all countries within the region to benefit from better meteorological weather forecasting.

69. For optimum use of national and regional resources, it was important to implement: (a) a worldwide geographic distribution of remote-sensing ground receiving stations and processing facilities; and (b) frequent exchange of remotely sensed data and experiences in the fields of space applications and space technology.

70. National Governments should pass legislation and establish frameworks addressing the prevailing issues, so that the promotion of space technology applications for societal and economic benefits would be accelerated.

71. Regional cooperation for disaster prediction and mitigation should be strengthened through the exchange of information, technology transfer and training of manpower. Short-term training, seminars and workshops could be arranged to generate awareness on the part of users and authorities of the Members States that would facilitate the use of the information network for exchange of data and knowledge.

72. The least developed countries might not have enough resources to invest in technology for developing a disaster prediction and management system. The possibility of international funding for that activity in the least developed disaster-prone countries should be explored.

C. Satellite communication and navigation

73. It was stated that the telecommunications infrastructure in the developing countries, in general, had remained underdeveloped and was usually confined to the urban areas; in many cases, the vast rural population had not been able to benefit from the advancements in communications technology. In such countries, the advent of space technology and its applications to telecommunications and broadcasting had been seen as a way to overcome the problems connected with the development of an extensive terrestrial infrastructure in order to provide minimal telecommunications services for the entire country.

74. The variations in the level of social and economic development were reflected in the disparities in the level of development of the telecommunications infrastructure and facilities available on the ground. However, the region was, by and large, characterized by dynamism, flexibility and adaptability, as shown by the rapid growth of the telecommunications sector, especially in the introduction of new services and, in particular, the use of communications satellites. Ten countries of the region (Australia, China, India, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Russian Federation and Thailand) had their own nationally operated domestic satellite communications systems, including some that had been indigenously developed and launched.

75. Distinct religious beliefs, linguistic roots, cultural traditions and varied terrain had resulted in uneven development in telecommunications infrastructure and facilities in the region and to disparities between countries, between different regions within countries and between the different segments of society. That in turn, had led to an inadequately developed telecommunications and satellite communications infrastructure that could not serve the entire population, especially the rural component, and/or support the varied applications and services available from communication satellites.

76. While there would be all-round advances and expansion in the various application areas of satellite communication technology, it appeared that, for developing countries, there would be certain areas that would experience the highest growth rates, receive the greatest priority and find the largest number of users, because of their greater potential and versatility. It was reasonable to expect that, in the foreseeable future, most of the pertinent telecommunication activities and services in developing countries would develop and revolve around those thrust areas, which had been identified as follows: (a) distance education; (b) mobile personal communications; (c) direct-to-home television and radio broadcasting; (d) telemedicine; (e) rural telecommunications; and (f) Internet services.

77. Developing countries should take the following actions to achieve the goal of optimal utilization of space communications and applications: (a) place greater emphasis on the establishment and expansion of telecommunications facilities in rural areas; (b) facilitate data and information exchange between networks in different countries and regions; (c) establish a common base or forum to continuously monitor space communications development in the region and to propose policy guidelines; (d) encourage countries and institutions to pool their limited resources; (e) strengthen and further extend existing collaborative programmes among developed and developing countries through appropriate arrangements; (f) assist the developing nations in enhancing their basic infrastructure, especially in the rural and undeveloped areas; (g) expand and improve educational facilities; (h) encourage the private sector to contribute to telecommunications development; and (i) rationalize policies, legislation and regulatory framework.

78. With regard to their existing and planned communication satellites, developed countries had a responsibility to keep in mind the needs of developing countries, in particular, in developing new technology which made possible the reduction of frequency utilization and the avoidance of radio interference between satellites in the geostationary orbit. The developed countries should lend their capabilities to ensuring that a balanced approach was followed in the allocation of frequency bands and orbital slots so that developing countries would not be at a disadvantage.

79. Satellite navigation and precise positioning were emerging as important satellite applications. The Global Positioning System (GPS) of the United States and the Global Orbiting Navigation Satellite System of the Russian Federation were operational satellite navigation systems that provided real time stand-alone position accuracies to nearly 10 metres. Time transfer accuracies of 20 nanoseconds were routinely available with GPS. It was widely known that those systems must be augmented if they are to meet civil aviation requirements for categories I, II and III precision approach landing.

80. The Wide Area Augmentation System of the United States and the European Geostationary Navigation Overlay Service were being implemented to cater to the needs of the civil aviation community for more precise positioning. GPS was being used for precise orbit determination of low-Earth orbiting and medium-Earth orbiting satellites.

D. Small satellites

81. It was stated that changing world politics and a shift of emphasis away from military build-up had brought considerable pressure on space agency financial budgets. Budgetary pressure, coupled with developments in microelectronics, had precipitated the use of smaller satellites as a "faster, cheaper, better" means of realizing space missions, complementary to conventional large satellite systems. Affordable small satellites, however, required an approach that was different from established space engineering techniques. Since 1979, the University of Surrey (United Kingdom) had pioneered cost-effective satellite engineering techniques for small satellites and had developed a series of highly sophisticated, yet inexpensive, "microsatellites", which cost around US$ 3 million each to build.

82. While obviously limited in payload mass, volume and power, but with very real and attractive advantages in terms of cost and response time, microsatellites complemented traditional "large" satellites by providing an alternative "gap-filler" for affordable quick-response or exploratory missions with both civil and military objectives. Developing space nations had used rapid and inexpensive microsatellite projects as the focus for effective technology transfer and an affordable first step into orbit.

E. Space technology education and training

83. It was stated that Governments in the region should show their political will and consistent support for

education in science and technology in general and space technology in particular. One important step would be the introduction of a comprehensive national legislation that removed major stumbling blocks and put into effect an efficient and effective policy for the applications of space technology in the development of the social and economic sectors. The policy should involve the highest levels of the Government.

84. Senior educators from universities should work and interact with departmental scientists at space agencies, especially on projects that required research for the development of new space application techniques. The secondment of such educators to space agencies would give university educators more direct contact with space technology and applications.

85. Another important prerequisite for the success of a space applications programme was the need for a close working relationship between the space agencies and the private sector. The latter should be encouraged in every possible way to enter the space applications market. Rather than compete with the private sector, the public sector should strive to cooperate with industry.

F. International and regional cooperation

86. It was stated that international and regional cooperation should be appropriate to the socio-economic conditions and circumstances in the region. International space activities should include joint projects that followed a step-by-step approach to ensure that the cooperation was sustainable.

87. It was important for developing countries participating in international space activities and cooperation to enhance their indigenous capabilities in space technology development, instead of merely becoming a market for the space technology products of developed and space-faring countries.

88. United Nations entities could and should play an active role in promoting international cooperation in space activities and, in particular, in coordinating various initiatives and regional cooperative programmes, as well as enhancing the awareness of Governments and the general public vis-à-vis space activities and their benefits to humanity.

Notes

[1] *Official Records of the General Assembly, Fifty-second Session, Supplement No. 20* (A/52/20).

[2] Ibid., para. 153.

[3] There are four regional working groups under ESCAP for implementing the recommendations made by the Ministerial Conference on Space Applications for Development in Asia and the Pacific: (a) regional working groups on Remote Sensing, Geographic Information Systems and Satellite-based Positioning; (b) regional working groups on Satellite Communication Applications; (c) regional working groups on Meteorological Satellite Applications and Natural Hazards Monitoring; and (d) regional working groups on Space Sciences and Technology Applications.

Annex

Programme of the Regional Preparatory Conference for the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) for Asia and the Pacific

Date/time	*Subject*	*Speaker*
Monday, 18 May 1998		
0800-0900	Registration	
0900-1030	**Opening ceremony**	
0900-0920	Conference theme address	Ade Abiodun (Office for Outer Space Affairs)
0920-0925	Welcome address	P. Young (United Nations Development Programme, Malaysia)
0925-0935	Welcome address	Giuseppe Giampalmo (European Space Agency)
0935-0950	Opening address	Datuk Law Hieng Ding Minister, Science Technology and the Environment (Malaysia)
0950-1020	Press conference	Mazlan Othman (Malaysia)
1020-1030	Visit to the exhibition	
1030-1040	Review of Conference procedures	Ade Abiodun (Office for Outer Space Affairs Mazlan Othman (Malaysia)
	Session I:	
	The Earth and its environment	
	Chairperson: C. Murthy (India)	
1040-1140	Solar-terrestrial relations and the environment	Mohammed Ilyas (Malaysia) Sohsuke Goto (Japan)
1140-1240	Disaster prediction, warning and mitigation	Qingxi Tong (China) D. Quadir (Bangladesh)

Date/time	*Subject*	*Speaker*
1400-1440	Management of Earth resources	Mazlan Hashim (Malaysia)
1440-1505	Remote sensing in the information age	Ade Abiodun (Office for Outer Space Affairs)
1505-1525	Exhibits at UNISPACE III	Mireille Girard (American Institute of Aeronautics and Astronautics)
1545-1800	Discussion of issues from session I (Solar-terrestrial relations and the environment)	*Chairperson*: H-S. Chung (Republic of Korea)
Tuesday, 19 May 1998		
	Session II:	
	Communication and navigation systems	
	Chairperson: M. H. Entezari (Islamic Republic of Iran)	
0900-1000	Space communications and applications	Salim Mehmud (Pakistan)
1000-1040	Satellites navigation and location systems	Suresh Kibe (India)
1100-1230	Discussion of issues from session II	*Chairperson*: M. H. Entezari (Islamic Republic of Iran)
1400-1530	Discussion of issues from session II (*continued*)	*Chairperson*: M. H. Entezari (Islamic Republic of Iran)
1550-1800	Discussion of issues from session I (*continued*) (Earth resources and natural disaster)	*Chairperson*: B. Hoochoong (Republic of Korea)
Wednesday, 20 May 1998		
	Session III	
	Benefits of space exploration, including the role of microsatellites	
	Chairperson: Mazlan Othman (Malaysia)	
0900-1000	Microsatellites	Sul Dal Choi (Republic of Korea) Martin Sweeting (United Kingdom)
1000-1040	Spin-off benefits and space commercialization	K. Radhakrishnan (India)

Date/time	*Subject*	*Speaker*
1100-1140	Economic and societal benefits of space exploration	Salim Mehmud (Pakistan)
1140-1230	Discussion of issues from session III	*Chairperson*: Qingxi Tong (China)
1400-1800	Discussion of issues from session III (*continued*)	*Chairperson*: Qingxi Tong (China)
Thursday, 21 May 1998		
	Session IV	
	Education, information and cooperation	
	Chairperson: H. A. Wimalagunawardhane (Sri Lanka)	
0900-1000	Education and training in space science and technology	Parth Roy (India)
1000-1025	Centres for space science and technology education	S. Murthy (India)
1025-1100	Promotion of international cooperation in space activities	Chen Yongzeng (China)
1100-1125	Presentation of the Committee on Earth Observation Satellites	S. Murthy (India)
1140-1240	Discussion of issues from session IV	*Chairperson*: Abdul Majid (Pakistan)
1400-1500	Discussion of issues from session IV (*continued*)	*Chairperson*: Abdul Majid (Pakistan)
1520-1800	Preparation of the draft report of the Preparatory Conference	
Friday, 22 May 1998		
0900-1230	Technical visits	Mazlan Othman (Malaysia)
1430-1700	Discussion and adoption of the draft report	*Chairperson*: Abdul Majid (Pakistan)
1720-1750	**Closing ceremony**	Dato' Abu Bakar Daud, Deputy Minister of Science, Technology and the Environment (Malaysia) Ade Abiodun (Office for Outer Space Affairs)